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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/660,054

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Shigeru Yamane

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EXAMINER

CROUSE, BRETT ALAN

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

12/26/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/660,054	Applicant(s) YAMANE ET AL.	
	Examiner Brett A. Crouse	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 September 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 37,40,59,76,84-87 and 96-105 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 37,40,59,76,84-87 and 96-105 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment, filed 5 September 2008.

Claims 37, 40, 59, 76, 84-87 and 96-105 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 37, 40, 76, 85-87 and 96-105 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakita et al., US 5,960,538, in view of Gause et al., US 3,895,158, in view of Yuhas et al., US 5,350,621 and in view of Arlon Inc., "Non-woven aramid reinforcements", March 27, 1995, for reasons of record in the office action of 12 June 2008.

4. Claims 59 and 84 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakita et al., US 5,960,538, in view of Gause et al., US 3,895,158, in view of Yuhas et al., US 5,350,621 and in view of Arlon Inc., "Non-woven aramid reinforcements", March 27, 1995, as applied to claims 37, 40, 76, 85-87 and 96-105 above, and further in view of Nakatani et al., US 6,096,411, for reasons of record in the office action of 12 June 2008.

Response to Arguments

5. Applicant's arguments have been fully considered but they are not persuasive.

Applicants argue with respect to the rejections over Kawakita et al., in view of Gause et al., in view of Yuhas et al., and in view of Arlon Inc., "Non-woven aramid reinforcements", March 27, 1995, and Kawakita et al., in view of Gause et al., in view of Yuhas et al., and in view of Arlon Inc., "Non-woven aramid reinforcements", March 27, 1995, and further in view of Nakatani et al., that the references alone or in combination fail to teach or suggest a layered composite structure in which the density of the fabric layer of the inside sheet is lower than that of the fabric surface sheet. The examiner respectfully disagrees for the reasons below.

Attention is directed to example 1 of Gause beginning in column 7. The example uses a paper / resin layer between glass / resin layers. The fiber resin ratio of the paper layer is 2.2-2.8 and the fiber resin ratio of the glass layers is 1.6-1.9. From the Typical Density of Papers reference the density of a super calendared glassine is 1.16-1.52 g/cc for the paper of the paper layer. From the Science Direct - Composite Structures reference, table 2, the density of e-glass is 2.6 g/cc.

For the paper layer the fiber resin ratio is treated as most favorable to applicant by selection of a volume ratio of 2.8 to maximize the amount of paper. For the glass layer the fiber resin ratio is also selected as most favorable to applicant by selection of a volume ratio of 1.6 to minimize the amount of glass. The densities of the paper and glass

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are also selected as most favorable to applicant 1.52 g/cc for paper and 2.6 g/cc for glass.

This should produce the highest density paper layer and lowest density glass layer for the data presented by Gauss.

Paper:

$$(2.8 \text{ paper volume} / 3.8 \text{ total volume}) (1.52 \text{ g/cc}) = 1.12 \text{ g/cc}$$

Glass:

$$(1.6 \text{ glass volume} / 2.6 \text{ total volume}) (2.6 \text{ g/cc}) = 1.6 \text{ g/cc}$$

The relative proportions of the paper and glass used in the layer structure of Gauss results in a density of fibrous material which is lower for the center layer than for the surface layer(s). It is noted that the selection of super calendared glassine paper for the paper of the example was done arbitrarily to maximize the calculated paper density. Gauss teaches a saturating grade wood cellulose paper and does not indicate the amount of calendaring.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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A page directed to CEM-1 composites for printed circuit boards from professionalplastics.com is included. The page is added to show the state of the art of printed-circuit-board composites having a paper core and glass surface.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brett A. Crouse whose telephone number is (571)-272-6494. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald L. Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. A. C./
Examiner, Art Unit 1794

/Bruce H Hess/
Primary Examiner, Art Unit 1794